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Field Sampling Plan for the Characterization of the Diesel Contamination in the TRA Perched Water Well PW-13

Idaho Completion Project

Bechtel BWXT Idaho, LLC

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Idaho Completion Project
Idaho Falls, Idaho 83415

Prepared for the
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Assistant Secretary for Environmental Management
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ABSTRACT

This field sampling plan has been developed to determine the causes of recurrent diesel fuel in well PW-13 at the Test Reactor Area of the Idaho National Engineering and Environmental Laboratory. The information obtained by completing the field sampling activities described in this plan will also be used to evaluate the flow paths and source water for perched water wells and the extent of diesel contamination in perched water bodies at the Test Reactor Area.

Well PW-13 was drilled and cored in 1990 to characterize contaminant occurrence and distribution in perched water bodies that had formed beneath the Test Reactor Area wastewater infiltration ponds. During coring operations, free-phase diesel was found in the corehole. Approximately 20 gal of diesel was bailed from the corehole during the next two months. No diesel was detected before completion of the well and during well development in January 1991. However, 1.03-ft-thick layer was measured in the well in 1999. The volume of diesel in the well decreased to nondetectable levels and subsequently returned at least twice since 1999.

Investigations after the discovery of the diesel attribute its presence to a 2,000-gal leak from a nearby fuel line (TRA-57) in 1981. A Track 2 investigation completed in 1991 resulted in a "no further action" determination for PW-13. A GWSCREEN model was completed during a 2001 Track 1 investigation of TRA-57, which is the fuel line believed to be the diesel source. The modeling was done to determine the risk from ingestion of aquifer water. The risk determination was based on all 2,000 gal of diesel migrating into the aquifer. The calculated volume of the diesel (2,000 gal) in the subsurface did not pose a risk to human health and the environment. Although it is still believed that the diesel pose s no significant threat to the aquifer, the fact that diesel has not dissipated as expected needs further investigation.

This field sampling plan describes the activities to be conducted at the Test Reactor Area to evaluate the mechanism for recurrence of the diesel and its potential impact on the environment. Two wells will be installed near PW-13 and TRA-57 (site of the diesel release). The wells will be sampled for diesel range organics, gasoline range organics, benzene, toluene, ethylbenzene, and xylene to determine the extent of the diesel contamination at these sites. Selected perched water and aquifer wells will also be sampled for various analytes, including alkalinity, anions, metal, hexavalent chrome, gamma spectrometry, strontium-90, tritium, and diesel range organics.

These data will be used for several purposes. Sampling for organic constituents will be used to evaluate the nature and extent of diesel-contamination. Sampling for inorganic constituents will be used to determine the source water for the perched water wells and the area of influence for the infiltrating sources at the Test Reactor Area. The data will help evaluate perched-water flow conditions that may be controlling the recurrence of diesel in the subsurface at PW-13. Two perched water wells will also be installed to further evaluate the nature and extent of contamination and potentially provide information about the mechanism controlling the diesel recurrence.

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ACRONYMS

bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CWSU	CERCLA waste storage unit
DOE-ID	U.S. Department of Energy Idaho Operations Office
DMCS	Document Management Control System
DQO	data quality objective
DR	decision rule
DRO	diesel range organics
DS	decision statement
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ETR	Engineering Test Reactor
FSP	field sampling plan
FTL	field team leader
GRO	gasoline range organics
HASP	health and safety plan
IAG	interface agreement
ICP	Idaho Completion Project
ID	identification
INEEL	Idaho National Engineering and Environmental Laboratory
MCP	management control procedure
MTR	Materials Test Reactor

PSQ	principal study question
QA	quality assurance
QAPjP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SPERT	Special Power Excursion Reactor Test
SRPA	Snake River Plain Aquifer
TBD	to be determined
TOS	task order statement
TRA	Test Reactor Area
WGS	Waste Generator Services

Field Sampling Plan for the Characterization of the Diesel Contamination in the TRA Perched Water Well PW-13

1. OVERVIEW

This field sampling plan (FSP) describes sampling activities that will help determine the reasons for recurrent diesel fuel in well PW-13 at the Test Reactor Area (TRA) of the Idaho National Engineering and Environmental Laboratory (INEEL). These activities are in accordance with the *Characterization Plan for Diesel Contamination in TRA Perched Water Well PW-13* (ICP 2004). Sampling activities have been designed to (a) evaluate the vertical thickness of the diesel contamination near perched water well PW-13, (b) help to evaluate flow paths in the perched water and areas of influence for each infiltrating water source, and (c) evaluate the current chemical disposition of the perched water. The investigation may provide information about the mechanism controlling the diesel recurrence.

These plans have been prepared pursuant to 40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," in accordance with guidance from the U.S. Environmental Protection Agency (EPA) on the preparation of sampling and analysis plans (SAPs) and in accordance with Management Control Procedure (MCP)-9439, "Preparation for Environmental Sampling Activities at the INEEL." The FSP describes the field sampling activities that will be performed, while the quality assurance project plan (QAPjP) (DOE-ID 2002) details the processes and programs that will be used to ensure that the data generated are suitable for their intended uses. The FSP develops the data quality objectives (DQOs) in which the collection of samples will be based. The governing QAPjP for this sampling effort will be the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites* (DOE-ID 2002). Work control processes will follow formal practices in accordance with the communicated agreement between the appropriate site area director and the Long-Term Stewardship project manager or designee(s).

1.1 Field Sampling Plan and Other Documentation

The primary purpose of this FSP is to define the collection of samples required to help determine the mechanism allowing continued reoccurrence of diesel fuel in well PW-13 and determine the extent of the contamination.

In addition, the *Groundwater Monitoring Plan for the Test Reactor Area Operable Unit 2-13* (DOE-ID 2004) will be used to conduct additional sampling that fulfills the sampling requirements outlined in the characterization plan. All work will be conducted under the *Health and Safety Plan for the Environmental Restoration Long-Term Sitewide Groundwater Monitoring* (Gurney 2003).

1.2 Project Organization and Responsibility

The organizational structure for this work reflects the resources and expertise required to plan and perform the work, while minimizing risks to worker health and safety. The health and safety plan (HASP) (Gurney 2003) provides the job titles of the individuals who will be filling the key managerial roles and lines of responsibility and communication.

2. SITE BACKGROUND

This section describes the site, the nature and extent of contamination, and the project.

2.1 Site Description

TRA is located in the south-central portion of the INEEL (Figure 2-1) and was built in the 1950s. TRA has been the site of high-neutron flux nuclear reactors and testing on the effects of radiation on materials, fuels, and equipment. Three nuclear reactors are located at TRA; currently, however, only the Advanced Test Reactor is operational. The Materials Test Reactor (MTR) and the Engineering Test Reactor (ETR) are no longer in service.

Well PW-13 is located approximately 50 ft southeast of the MTR on the south end of Pike Street at TRA. Diesel was found in perched ground water during the coring of the well in 1990. The diesel has decreased to nondetectable levels but has returned at least twice since 1990.

2.2 Nature and Extent of Contamination

A review of historical documents and current knowledge strongly indicates that source of diesel was the diesel transfer line (TRA-57) that ran from TRA-727 and TRA-775 to ETR. The fuel line was installed in the late 1950s and was abandoned in the early 1980s. Two leaks are documented for this line. The leaks occurred in 1980 and 1981 and are documented in the *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills* (Sherwood et al. 1994). The TRA-57 Track 1 investigation also documents the 1981 diesel spill and provides information that was not included in Sherwood et al. (1994).

The 1980 leak may have been noted due to discrepancies between utilities usage and storage tank volumes (Sherwood et al. 1994). The leak was noted as having been fixed, but the discrepancies may have been caused by an operational change in the output of the generator rather than by a leak. The *Environmental Characterization Report for the Test Reactor* Area (Doornbos et al. 1991) stated that the line was replaced from TRA-605 to the turn between MTR and ETR. No estimation of volume or information concerning removal or discovery of contaminated soil around the reported excavation could be located.

The 1981 leak occurred at an elbow in the fuel transfer line 60 ft southeast of ETR. The leak was discovered when the day tank supplying the ETR generator would not fill while the transfer pumps were operating at full capacity. A volume of 2,000 gal was estimated to have been released based on the pumping rates, the time that the tank was noticed not to be filling, and the capacity of the transfer pipe (Sherwood et al 1994). The day tank was excavated for inspection, which revealed that the tank had not leaked. The fuel transfer line was repaired by splicing the fuel line into an abandoned steam line. In December 1990, a Tracer Tight test was conducted on the fuel line (INEEL 2002), but the test revealed no leaks in the reconfigured fuel line.

Two diesel tanks were associated with the TRA-57 diesel line. Both were removed in the early 1990s. Neither tank showed signs of leakage, although some contaminated soil was removed during the ETR-648 tank excavation (INEEL 1993a, 1993b).

Further research did not reveal another possible point of origin for the diesel contamination. Maps of utilities in the area showed no other nearby transfer lines, and the only fuel tanks in the area were removed. Fuel tanks currently in use are at the north end of TRA, over 1,800 ft north of PW-13. No spills of significant quantities were reported in the area of PW-13.

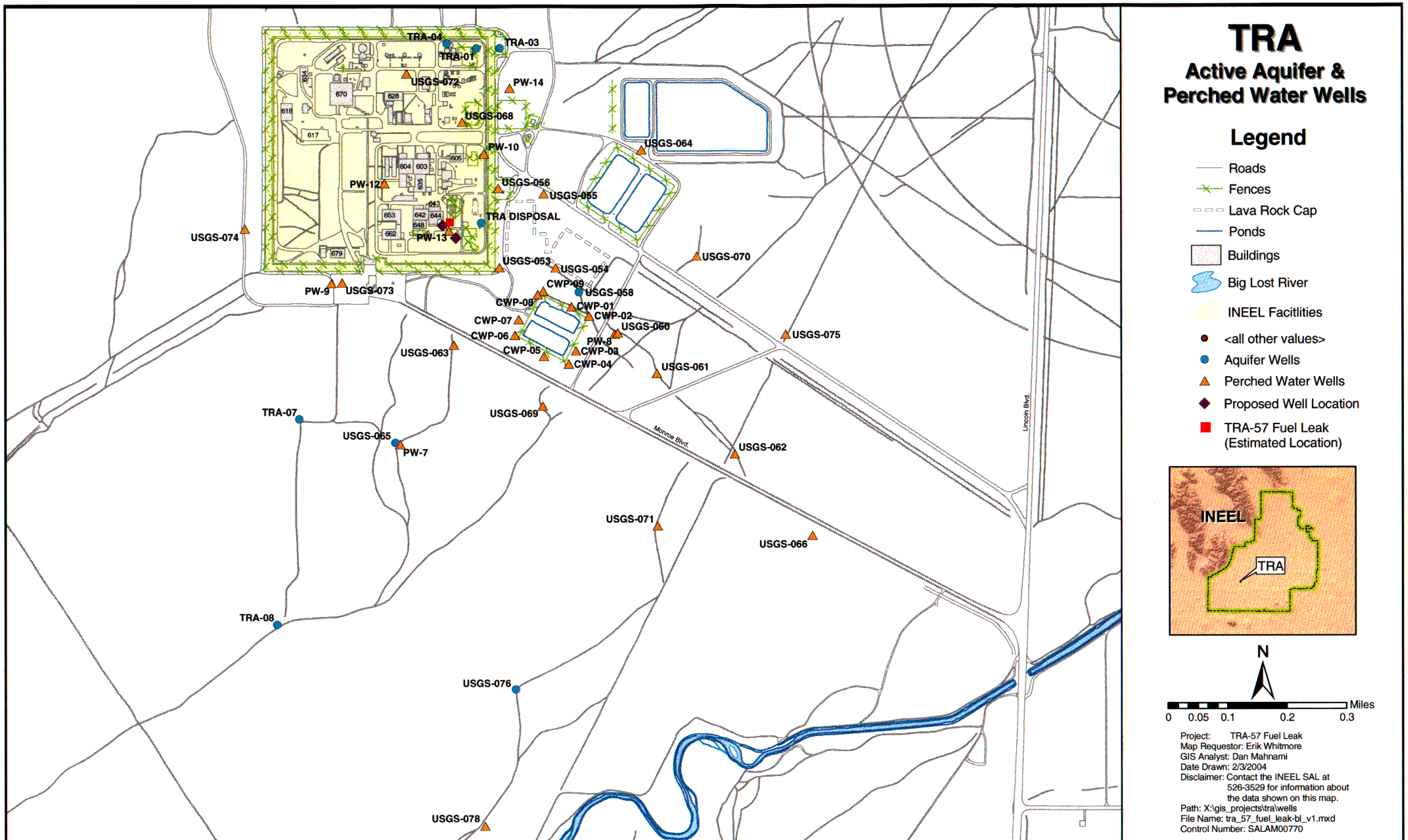

Figure 2-1. The Test Reactor at the Idaho National Engineering and Environmental Laboratory.

The full extent of the diesel contamination is currently unknown, but the presence of diesel has only been noted in PW-13. The release site is located approximately 60 ft northeast of PW-13 (Figure 2-2). Nearby perched-water wells have not shown any indication of diesel, such as a floating layer or a diesel odor; however, several of these wells are screened incorrectly to allow floating free-phase diesel to be captured by the well. Potential concentrations of dissolved diesel concentrations in water from these perched wells may provide information about the extent of contamination.

2.3 Project Description

The activities associated with this project are outlined in the *Characterization Plan for Diesel Contamination in TRA Perched Water Well PW-13* (ICP 2004). That plan proposes the drilling and installation of two perched water wells near PW-13 and the TRA-57 fuel transfer line release site (Figure 2-2). The outlined work also includes the sampling of these wells as well as selected aquifer and perched water wells. Sampling in these wells will include inorganic, organic, and radiological analyses outlined in the following sections. Sampling conducted under this FSP will only include the perched wells that are to be drilled. All other sampling will be conducted in conjunction with the TRA semiannual groundwater monitoring and will be subject to the *Groundwater Monitoring Plan for the Test Reactor Area Operable Unit 2-13* (DOE-ID 2004). Proposed drilling locations are shown in Figure 2-2. The boreholes will be logged in accordance with MCP-1306, **"Geologic Logging."**

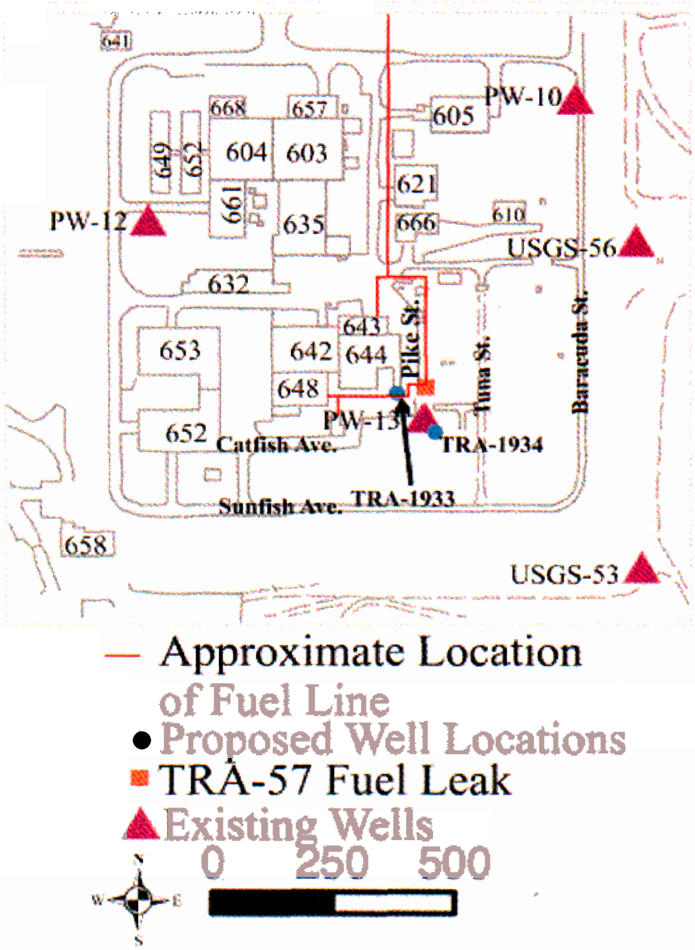

Figure 2-2. Map of the Test Reactor Area with proposed well locations and diesel release site.

3. SAMPLING OBJECTIVES

Data needs and DQOs for conducting the proposed drilling and sampling of the subsurface near PW-13 are defined in the following subsections. Data needs have been determined through evaluation of existing information and the projection of data requirements for analysis of samples collected during the drilling and sampling of the two proposed wells.

3.1 Data Quality Objectives

The DQOs were developed following the seven-step process outlined in *Guidance for the Data Quality Objectives Process* (EPA 2000). The DQOs in these subsections provide the basis for the sampling to be performed. Section 4 provides a summary of the sampling locations, frequencies, and analytical requirements.

3.1.1 Problem Statement

The objective of DQO Step 1 is to use relevant information to clearly and concisely state the problem to be resolved. The problem statements associated with this DQO process step are as follows:

- <u>Problem Statement 1—Extent of diesel contamination</u>: Evaluate the vertical thickness of the free-phase diesel and horizontal extent of contamination.
- <u>Problem Statement 2—Recurrence of contamination</u>: Evaluate the conditions and/or parameters for the movement of diesel and water in the perched water.

3.1.2 Decision Identification

The goal of DQO Step 2 is to define the questions that the study will attempt to resolve and to identify the alternative actions that may be taken based on the outcome of the study. Alternative actions are those actions resulting from the resolution of the stated principal study questions (PSQs). The types of alternative actions considered depend on the answers to the PSQs. The PSQs and their corresponding alternative actions will then be joined to form decision statements (DSs). The PSQs, alternative actions, and resulting DSs for the PW-13 sampling effort are provided in Table 3-1.

3.1.3 Identify Inputs to the Decision

The purpose of DQO Step 3 is to identify the type of data needed to resolve each DS identified in DQO Step 2. These data could already exist or could be derived from computational or surveying/sampling and analysis methods. In addition, analytical performance requirements (e.g., practical quantitation limits, precision, and accuracy) are provided in this step for any new data that will be collected.

3.1.3.1 Information Required to Resolve Decision Statements. Table 3-2 specifies the information (data) required to resolve each DS identified in Subsection 3.1.2 and identifies whether these data already exist. For the data that are identified as existing, the source references for the data have been provided with a qualitative assessment as to whether the data are of sufficient quality to resolve the corresponding DS. The qualitative assessment of the existing data was based on factors such as the evaluation of the corresponding quality control (QC) data (e.g., spikes, duplicates, and blanks), detection limits, and data collection methods.

Table 3-1. Summary of Data Quality Objective Step 2 information.

PSQ #1—What is the vertical thickness of the free-phase diesel and horizontal extent of contamination in the subsurface?

Alternative Action	Error Associated with Incorrect Action	Consequences of Error	Severity of Consequences
The vertical thickness of the free-phase diesel is properly defined, delineating the free-product thickness.	The thickness of the free-phase diesel is erroneously determined to be less than it is.	The volume of free-phase diesel in the subsurface is greater than anticipated.	Moderate
The vertical thickness of the free-phase diesel is improperly defined, failing to delineate the free-product thickness.	The thickness of the free-phase diesel is erroneously determined to be greater than it is.	The volume of free-phase diesel in the subsurface is less than anticipated.	Low
The horizontal extent of contamination is properly defined delineating the extent of contamination.	Extent of contamination is erroneously determined to be less than it is.	Subsurface contamination resides beyond the defined extent of contamination.	Moderate
The horizontal extent of contamination is not properly defined delineating the extent of contamination.	Extent of contamination is erroneously determined to be wider than it is.	Subsurface contamination encompasses a smaller area than believed.	Low

DS #1— Evaluate the thickness of the free-phase diesel and the horizontal extent of contamination underlying TRA in the vicinity of PW-13.

PSQ #2—Have the subsurface conditions and/or parameters for the movement of water and diesel in the perched water been adequately defined?

Alternative Action	Error Associated with Incorrect Action	Consequences of Error	Severity of Consequences
Presence of unanticipated sources or unexpected conditions.	Incorrect numerical or conceptual model assumptions.	Contaminant transport may differ from currently accepted transport theories.	Moderate
Sources, parameters and conditions are as anticipated	Numerical model and conceptual models assumptions are correct.	Unnecessary activities may be performed.	Low

DS #2— Based on analytical data, evaluate the conditions in the subsurface and the potential infiltration sources.

DS = decision statement
PSQ = principal study question

Table 3-2. Required information and reference sources.

DS #	Measurement Variable	Required Data	Do Data Exist?	Source Reference	Sufficient Quality?	Additional Information Required?
1	BTEX, DRO, and GRO concentrations in the perched water.	Field observations and laboratory measurements of contaminants	No			Yes
2	Alkalinity, anions, Cr, metals, gamma spectrometry, strontium-90, and tritium concentrations in the perched water	Laboratory measurements of contaminants	No			Yes

BTEX = benzene, toluene, ethylbenzene, and xylene
DRO = diesel range organics
DS = decision statement
GRO = gasoline range organic

3.1.3.2 Computational and Survey/Analytical Methods. Table 3-3 identifies the DSs where data either do not exist or are of insufficient quality to resolve the DSs. For these DSs, Table 3-3 presents computational and surveying/sampling methods that could be used to obtain the required data.

Table 3-3. Information required in order to resolve the decision statements.

DS #	Measurement Variable	Required Data	Computational Methods	Survey/Analytical Methods
1	BTEX, DRO and GRO concentrations	Total contaminant concentrations in the samples	Compare contaminant concentrations to previous levels in PW-13 and identification of contaminants in samples.	Field observation and analytical laboratory determination of contaminant concentrations in samples
2	Alkalinity, anions, Cr, metals, gamma spectrometry, strontium-90, and tritium concentrations	Total contaminant concentrations in the samples	Compare contaminant concentrations to previous levels in the existing wells and source waters.	Field observation and analytical laboratory determination of contaminant concentrations in samples and subsurface conditions.

BTEX = benzene, toluene, ethylbenzene, and xylene
DS = decision statement
DRO = diesel range organics
GRO = gasoline range organics.

3.1.3.3 Analytical Performance Requirements. The analytical performance requirements for the data that need to be collected to resolve each DS are specified in the QAPjP (DOE-ID 2002). These performance requirements include practical quantitation limit, precision, and accuracy requirements for the contaminant. The QAPjP will also provide analytical methods, sample preservation, and sample size (DOE-ID 2002).

3.1.4 Study Boundaries

The primary objective of DQO Step 4 is to define the spatial and temporal boundaries that apply to each DS, define the scale of decision-making, and identify any practical constraints (hindrances or obstacles) that must be taken into consideration in the sampling design. Implementing this step ensures that the sampling design will result in the collection of data that accurately reflect the condition of the site under investigation.

3.1.4.1 Geographic Boundaries. Limiting the geographic boundaries of the study area ensures that the investigation does not expand beyond the original scope of the task. This study will focus on the perched water beneath TRA and on selected downgradient aquifer wells. The primary study area will be within 250 ft of PW-13. Boreholes will be advanced 90 to 100 ft below land surface (bls). Diesel is anticipated to be encountered only at the top of the perched water body at approximately 73 ft bls. Sampling conducted as part of the TRA semiannual groundwater monitoring program will be constrained to the perched water beneath TRA and six selected aquifer wells.

3.1.4.2 Temporal Boundaries. The temporal boundary refers to the timeframe that each DS applies to (e.g., number of years) and when the data optimally should be collected (e.g., season, time of day, weather conditions). Temporal boundaries are important when contaminant concentration or subsurface changes over time are significant. The samples will be collected in the shortest span of time practical to limit the potential for subsurface variation.

3.1.4.3 Practical Constraints. Practical constraints include physical barriers, difficult sample matrices, high-radiation areas, or any other condition that will need to be taken into consideration in the design and scheduling of the sampling program. The PW-13 drilling sites are located near numerous subsurface and overhead utilities, roadways, and buildings. Drilling locations, shown in Figure 2-2, have limited access due to the subsurface and aboveground obstructions. Subsurface utilities, not shown in Figure 2-2, will be located before the well locations are finalized. The field team will have to consider these barriers and constraints during the setup of their field sites.

3.1.5 Develop a Decision Rule

The purpose of DQO Step 5 initially is to define the statistical parameter of interest (e.g., mean and 95% upper confidence level) that will be used for comparison against the action level. Table 3-4 summarizes the decision rule (DR) for the DS provided in Subsection 3.1.2.

3.1.6 Decision Error Limits

Because analytical data can only estimate the true condition of the site under investigation, decisions that are made based on measurement data could be in error (i.e., decision error). Therefore, the primary objective of DQO Step 6 is to determine which DSs (if any) require a statistically based sample design. The purpose of determining the decision error limits is to specify the decision-maker's tolerable limits on decision errors, which are used to establish performance goals for the data collection design.

Table 3-4. Decision rule.

DS #	DR #	Decision Rule
1	1	**If** the vertical thickness is less than or equal to the anticipated extent, **then** no further action will be necessary. Otherwise, further actions may be necessary.
2	2	**If** the data obtained are sufficient to evaluate the conditions and/or parameters for movement of diesel and water in the perched water, **then** additional sampling will not be necessary. Otherwise, additional data may need to be obtained.

DR = decision rule
DS = decision statement

Tolerable error limits help in the development of sampling designs to ensure that the spatial variability and sampling frequency are within specified limits. For DSs 1 and 2, selection of the drilling location for the sampling is based on professional judgment rather than statistics. Therefore, error limits are not used to determine sampling locations or frequency.

3.1.7 Optimize the Design

The objective of DQO Step 7 is to present alternative data collection designs that meet the minimum data quality requirements, as specified in DQO Steps 1 through 6. Then, a selection process is used to identify the most resource-effective data collection design that satisfies all of the data quality requirements.

For DSs 1 and 2, sampling will occur in the perched water within 250 ft of PW-13 and the location of the diesel release. The boreholes will be advanced to a depth of 95 to 100 ft bls. Diesel is only anticipated to be encountered at the top of the perched water zone at approximately 73 ft bls. Boreholes will be advanced to sufficient depth to install a perched water monitoring well. The objective is to obtain field observations and analytical results that will help evaluate the extent of contamination and find the mechanism causing the continued recurrence of diesel. These samples will be analyzed using standard laboratory methods to constrain the lateral extent of the contamination and the concentrations of the contaminants of potential concern.

Boreholes will be drilled utilizing a dual rotary (DR) system. DR casing (8-5/8 in.) will be advanced to basalt. Drilling will continue to the total depth with a 7-7/8-in. bit. Upon reaching total depth, the drill string will be removed, and a video log will be completed. Geophysical logs will be run if the schedule and hole stability permit. The 4-in., stainless-steel well screen and associated stainless-steel casing will be inserted into the hole to the depth specified by the project engineer. The well screen will be installed with approximately 10 ft of screen above the perched water. The screened area above the perched water will allow for potential free-phase diesel to enter the well during periods when the perched water level increases. The project engineer will determine the placement of the screened interval based on field conditions and historical data regarding the perched water. A filter sand pack will be installed, via tremie, to cover the screened interval to a minimum of 5 ft above the top of the screen. A bentonite seal will then be installed from the top of the sand pack to ground surface. During installation of the bentonite, a 6-in., carbon-steel protective surface casing will be installed. A minimum of 18 ft of casing will be below ground surface in accordance with the state of Idaho requirements. The protective casing will extend 3 ft above ground surface. A surface completion, including cement pad and impingement post, will be installed per INEEL specifications.

3.2 Quality Assurance Objectives for Measurement

The quality assurance (QA) objectives for measurement will meet or surpass the minimum requirements for data quality indicators established in the QAPjP (DOE-ID 2002). The QAPjP provides minimum requirements for the following measurement quality indicators: precision, accuracy, representativeness, completeness, and comparability. Additionally, precision, accuracy, and completeness will be calculated in accordance with the requirements of the QAPjP (DOE-ID 2002).

3.2.1 Precision

Precision is a measure of the reproducibility of measurements under a given set of conditions. In the field, precision is affected by sample collection procedures and by the natural heterogeneity encountered in the environment. Overall precision (field and laboratory) can be evaluated by using duplicate samples collected in the field. Typically, greater precision is required for analytes with very low action levels that are close to background concentrations.

Laboratory precision will be based on the use of laboratory-generated duplicate samples or matrix spike/matrix spike duplicate samples. The project will evaluate laboratory precision during the data review process.

3.2.2 Accuracy

Accuracy is a measure of bias in a measurement system. Laboratory accuracy is demonstrated using laboratory control samples, blind QC samples, and matrix spikes. The project will evaluate laboratory accuracy during the data review process. Sample handling, field contamination, and the sample matrix in the field affect overall accuracy.

3.2.3 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which the sampling and analysis data accurately and precisely represent the characteristic of a population parameter being measured at a given sampling point or for a process or environmental condition. Representativeness will be evaluated by determining whether measurements are made and physical samples are collected in such a manner that the resulting data appropriately gauge the media and phenomenon measured or studied. The comparison of all field and laboratory analytical data sets obtained throughout this remedial action will be used to ensure representativeness.

3.2.4 Detection Limits

Detection limits will meet the detection limits listed in the QAPjP (DOE-ID 2002). Detection limits will be as specified in the Sample and Analysis Management laboratory master task agreement statements of work and task order statements of work.

3.2.5 Completeness

Completeness is a measure of the quantity of usable data collected during the field sampling activities. The QAPjP (DOE-ID 2002) requires that an overall completeness goal of 90% be achieved for noncritical samples. If critical parameters or samples are identified, a 100% completeness goal is specified. Critical data points are the sample locations or parameters for which valid data must be obtained in order for the sampling event to be considered complete.

The end use of the data generated as a result of this sampling activity serves two purposes, as discussed in Subsection 3.1.1. For this project, all data will be considered noncritical with a completeness goal of 90%.

3.2.6 Comparability

Comparability is a qualitative characteristic that refers to the confidence with which one data set can be compared to another. At a minimum, comparable data must be obtained using unbiased sampling designs. If sampling designs are biased, the reasons for selecting another design should be well documented. Data comparability will be assessed through the comparison of all data sets collected during this study using the following parameters:

- Data sets will contain the same variables of interest.
- Units will be expressed in common metrics.
- Similar analytical procedures and QA will be used to collect data.
- Time measurements of variables will be similar.
- Measuring devices will have similar detection limits.
- Samples within data sets will be selected in a similar manner.
- Number of observations will be of the same order of magnitude.

4. SAMPLING LOCATION AND FREQUENCY

The material presented in this section is intended to support the DQOs summarized in Section 3.

The QA samples will be included to satisfy the QA requirements for the field operations in accordance with the requirements in the QAPjP (DOE-ID 2002). The duplicate QA/QC samples will be analyzed as outlined in Section 3.

Water samples will be collected after the installation and development of the wells. Samples will be collected after a minimum of five well volumes have been purged or until water parameters stabilize such that a perched water sample that is unaffected by drilling can be collected. Samples will be collected for diesel range organics (DRO), gasoline range organics (GRO), and benzene, toluene, ethylbenzene, and xylene (BTEX) to determine concentrations of diesel contamination in each well. Samples will also be collected for metals, alkalinity, anions, gamma spectrometry, tritium, and hexavalent chrome to help identify flow paths and the source water for the well. Table 4-1 lists the analyses selected for the two proposed wells. Additional project sampling is located in the *Groundwater Monitoring Plan for the Test Reactor Area Operable Unit 2-13* (DOE-ID 2004).

Table 4-1. Wells selected for sampling and their analyses.

Well	Alkalinity	Metals[a]	Anions	Cr	Gamma	Tritium	Sr-90	DRO	GRO	BTEX
TRA-1933[b]	X	X	X	X	X	X	X	X	X	X
TRA-1934[b]	X	X	X	X	X	X	X	X	X	X

a. The metals consist of Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Si, Ag, Na, Sr, Tl, U, V, and Zn.
b. Proposed wells to be drilled for this characterization plan.

5. SAMPLING DESIGNATION

5.1 Sample Identification Code

A systematic character identification (ID) code will be used to uniquely identify all laboratory samples. Uniqueness is required for maintaining consistency and preventing the same ID code from being assigned to more than one sample.

The first three designators of the code will always be **TRA**, representing the origin of the sample from the TRA subsurface. The next three numbers designate the sequential sample number for the project. Then, a two-character set (i.e., 01, 02) will be used to designate field duplicate samples. The last two characters refer to a particular analysis and bottle type.

For example, a sample collected in support of determining the BTEX concentrations might be designated as TRA00101BX, where (from left to right):

- **TRA** designates the sample as originating from the TRA subsurface.
- **001** designates the sequential sample number.
- **01** designates the type of sample (01 = original, 02 = field duplicate).
- **BX** designates BTEX analysis.

A SAP table/database will be used to record all pertinent information associated with each sample ID code.

5.2 Sampling and Analysis Plan Table/Database

A SAP table format was developed to simplify the presentation of the sampling scheme for project personnel. The following sections describe the information recorded in the SAP table, which is presented in Appendix A.

5.2.1 Sample Description

The sample description fields contain information about individual sample characteristics.

5.2.1.1 Sampling Activity. The sampling activity field contains the first six characters of the assigned sample number. The sample number in its entirety will be used to link information from other sources (field data, analytical data, etc.) to the information in the SAP table for data reporting, sample tracking, and completeness reporting. The analytical laboratory will also use the sample number to track and report analytical results.

5.2.1.2 Sample Type. Data in this field will be selected from the following:

REG	for a regular sample
QC	for a QC sample.

_5.2.1.3_ **_Media._** Data in this field will be the following:

WATER	for water samples.

_5.2.1.4_ **_Collection Type._** Data in this field will be selected from the following:

GRAB	for core sample collection
DUP	for field duplicate samples.

_5.2.1.5_ **_Planned Date._** This date is related to the planned sample collection start date.

5.2.2 Sample Location Fields

This group of fields pinpoints the exact location for the sample in three-dimensional space, starting with the well name and narrowing. For water samples, only a well name will be listed.

_5.2.2.1_ **_Area._** The AREA field identifies the general sample collection area. This field should contain the standard identifier for the INEEL area being sampled. For this investigation, samples are being collected from TRA, and the AREA field identifier will correspond to this site.

_5.2.2.2_ **_Location._** The LOCATION field contains the well name for the sample to be collected. Geographical coordinates, x-y coordinates, building numbers, or other location-identifying details, as well as program-specific information such as borehole or well number will denote the location. Data in this field normally will be subordinated to the AREA. This information is included on the labels generated by Sample and Analysis Management to aid sampling personnel. For this study, the LOCATION will be the well name, either TRA-1933 or TRA-1934.

_5.2.2.3_ **_Type of Location._** The TYPE OF LOCATION field supplies descriptive information concerning the exact sample location. For this study, the TYPE OF LOCATION field will be WELL.

_5.2.2.4_ **_Depth._** The DEPTH of a sample location is the distance in feet from surface level, or a range in feet from the surface, and will be listed as TBD or To Be Determined.

5.2.3 Analysis Types

_5.2.3.1_ **_AT1–AT14._** These fields indicate analysis types (for example, radiological, chemical, or hydrological). Space is provided at the bottom of the form to clearly identify each type. A standard abbreviation will also be provided, if possible.

6. SAMPLING PROCEDURES AND EQUIPMENT

This section describes the sampling procedures and equipment to be used for the planned sampling and analyses described in this FSP. Before beginning any sampling activities, a pre-job briefing will be held to review the requirements of the FSP and the project HASP (Gurney 2003) and to ensure that all supporting documentation has been completed.

6.1 Sampling Requirements

Requirements for the PW-13 characterization sampling activity are outlined in the following subsections.

6.1.1 Site Preparation

All required documentation and safety equipment will be assembled at the sampling site, including radios, fire extinguishers, personal protective equipment, sample bottles, sampling tools and equipment, and accessories. All sampling personnel are responsible for having read both this FSP and the HASP (Gurney 2003) before sampling. The field team leader (FTL) will hold a daily site briefing to discuss potential hazards and ensure that all personnel have the required training. The FTL will assign a team member to maintain document control, and the FTL will note this assignment in the FTL logbook in accordance with MCP-1194, "Logbook Practices for ER and D&D&D Projects."

6.1.2 Sample Collection

If possible, the samples will be collected immediately after purging the well. Water level and diesel thickness (if present) will be measured immediately before and after the well is purged. The well will be purged a minimum of three well casing volumes until pH, temperature, dissolved oxygen, and specific conductance of the purge water have stabilized, or until a maximum of five well-casing volumes have been removed. If the well goes dry before purging three well-casing volumes, purging will be considered complete. The well will be allowed to recover and samples will be collected within 24 hr of purging. If the parameters have not stabilized after five volumes have been removed, samples will be collected and appropriate notations will be recorded. If sampling is conduct immediately after the development of the well, a minimum of five well volumes will be removed before sampling. If parameters have not stabilized after five volumes, purging will continue until parameters have stabilized or an additional five volumes have been removed. All parameters (pH, temperature, dissolved oxygen, and specific conductance) will be recorded in the field logbook.

Samples will be collected at the locations and for analyses shown in Table 4-1. Sampling requirements for containers, hold times, sample volumes, and analyses methods are defined in Table 6-1.

6.1.3 Decontamination

All sampling and drilling equipment that comes in contact with the sample media will be decontaminated following the procedures delineated in Guide (GDE)-140, "Decontaminating Sampling Equipment." Dry decontamination methods will be used to the extent practicable to minimize the generation of liquid decontamination waste.

Table 6-1. Specific sample requirements for groundwater samples.

Analytical Parameter	Container Size[a]	Container Type	Preservative	Holding Time
Chromium (filtered and unfiltered)	1 L	HDPE	pH <2 with HNO_3	6 months
Tritium	125 mL	Glass	None	6 months
Strontium-90	1 L	HDPE	pH <2 with HNO_3	6 months
Gamma-emitting radionuclides	1 L	HDPE	pH <2 with HNO_3	6 months
Iodine-129[b]	8 L	HDPE	None	28 days
Technetium-99[b]	1 L	HDPE	pH <2 with HNO_3	6 months
Alkalinity	125 mL	HDPE	Cool to 4°C	14 days
Anions	125 mL	HDPE	Cool to 4°C	28 days
Metals	125 mL	HDPE	pH <2 with HNO_3	180 days
Nitrate/Nitrite	125 mL	HDPE	Cool to 4°C	28 days
BTEX	3 × 40 mL	Glass	pH < 2 with H_2SO_4, cool to 4°C	14 days
DRO[c]	1,000 mL	HDPE	Cool to 4°C	14 days to extraction and 40 days between extraction and analysis
GRO[d]	3 × 40 mL	Glass	pH < 2 with H_2SO_4, cool to 4°C	14 days

a. Size may change depending on laboratory. Refer to field guidance forms before sampling.
b. Samples will be collected for this analyte for one round only following completion of the WAG 2 five-year review.
c. DRO is noted as TPH/Diesel on the SAP tables.
d. GRO is noted as TPH/Gasoline on the SAP tables.
HDPE = high-density polyethylene

6.1.4 Shipping Screening

Given that the radionuclide contamination is at background levels for the area in the immediate vicinity of PW-13, radiological control methods will suffice for screening. If a sample is questionable, it can be submitted to the Radiation Measurements Laboratory located at the Test Reactor Area of the INEEL for a 20-minute gamma screen before shipment. Gamma screening will require that a separate sample be collected for analysis.

6.1.5 Sample Shipping

Samples will be transported in accordance with the regulations promulgated in 49 CFR 171 through 173 and 175 through 178 and EPA sample handling, packaging, and shipping methods delineated in 40 CFR 262, Subpart C, "Pre-Transport Requirements," and 40 CFR 263, "Standards Applicable to

Transporters of Hazardous Waste." Additional information pertaining to sample shipping is found in MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." All samples will be packaged and transported to protect the integrity of the samples and prevent sample leakage.

All samples require cooling for preservation. Upon receipt, laboratory personnel will verify the condition of the samples, including temperature. The laboratory will communicate any discrepancies to the field personnel and the project through Sample and Analysis Management. Project personnel will determine the appropriate corrective action on a case-by-case basis.

6.2 Handling and Disposition of Remediation Waste

Characterization waste will be generated during the sampling activities, as described herein. The disposition and handling of waste for this project will be conducted in accordance with direction from Waste Generator Services (WGS). Samples will be handled in accordance with MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." All waste streams generated from the sampling activity will be characterized, handled, stored, and disposed of in accordance with WGS direction.

All Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-generated waste will be maintained in accordance with the requirements of the previously established CERCLA Waste Storage Unit (CWSU) in which the waste is stored. All CWSUs at the INEEL have been established in accordance with the applicable or relevant and appropriate requirements. This waste will be maintained in compliant storage until it can be disposed of at an approved facility.

Waste will be generated because of the sampling activities conducted during this project. Types of waste expected to be generated include the following:

- Cuttings
- Purge water
- Personal protective equipment
- Liquid decontamination residue
- Solid decontamination residue
- Plastic sheeting
- Unused/unaltered sample material
- Sample containers
- Hydraulic spills
- Miscellaneous waste.

The waste generated could be hazardous, and as sampling continues, additional waste streams could be identified. All new waste streams, as well as those identified above, are required to have the waste identified and characterized. A hazardous waste determination must be completed and presented to the appropriate waste management organization (for example, WGS) for approval by that organization at the time of generation. The waste associated with the sampling activities will be managed in manner that complies with the established procedures, protects human health and the environment, and minimizes waste to the extent possible.

6.2.1 Waste Minimization

Waste minimization techniques will be incorporated into planning and daily work practices to improve worker safety and efficiency. In addition, such techniques will help to reduce the project environmental and financial liability. Specific waste minimization practices to be implemented during the project will include, but not be limited to, the following:

- Excluding materials that could become hazardous waste in the decontamination process (if any)
- Controlling transfer between clean and contaminated zones
- Designing containment such that contamination spread is minimized
- Collecting all samples necessary at one time such that additional waste is not generated from re-sampling.

Efforts to be expended and the reports required to track waste generated by projects are addressed in the *U.S. Department of Energy - Idaho Operations Office Idaho National Engineering and Environmental Laboratory Interim Pollution Prevention Plan* (DOE-ID 2000). That plan directs that the volume of waste generated by INEEL operations be reduced as much as possible.

Contaminated waste has the potential to be hazardous. This waste will require segregation as either incinerable (for example, wipes, personal protective equipment) or nonincinerable (for example, polyvinyl tubing) in anticipation of subsequent waste management. Containers for collection of contaminated waste will be clearly labeled to identify waste type and will be maintained inside the controlled area, as defined in the HASP (Gurney 2003), until removal for subsequent management.

6.2.2 Laboratory Samples

All laboratory and sample waste will be managed in accordance with Sample and Analysis Management master task agreements as part of the contract for the subcontracted laboratories. The laboratory will dispose of any unused sample material. The laboratories are responsible for any waste generated as a result of analyzing the samples. In the event that unused sample material must be returned from the laboratories, only the unused, unaltered samples in the original sample containers will be accepted from the laboratory. These samples will be returned to the waste stream from which they originated. If the laboratories must return altered sample material (for example, analytical residue), the laboratories will specify the types of chemical additives used in the analytical process and assist in making a hazardous waste determination. This information will be provided to the project FTL and environmental compliance coordinator. In addition, management of this waste will require separation from the other unaltered samples being returned.

6.2.3 Packaging and Labeling

Containers used to store and transport hazardous waste must meet the requirements of 40 CFR 264, Subpart I, "Use and Management of Containers." The *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2003) document contains additional details about packaging and container conditions. Appropriate waste containers include 55-gal drums and other suitable containers that meet the U.S. Department of Transportation's regulations on packaging (49 CFR 171, 173, 178, and 179) or the requirements outlined in the INEEL waste acceptance criteria document (DOE-ID 2003). The WGS will be consulted to ensure that the packaging is acceptable to the receiving facility.

Waste containers will be labeled with standard waste labels. The labels will include the following information:

- Unique bar code serial number
- Name of generating facility
- Phone number of generator contact
- Applicable waste code(s)
- Waste package gross weight
- Waste accumulation start date
- Maximum radiation level on contact and at 3 ft in air
- Waste stream or material identification number assigned by WGS
- Before shipping, other labels and markings required by 49 CFR 172, Subpart D, "Marking," and 49 CFR 172, Subpart E, "Labeling."

Any of the above information that is unknown when the waste is labeled may be added when the information is known.

WGS will assign a unique bar code serial number to each waste container. A new bar code will be affixed to each container when waste is first placed in the container.

Any waste shipped off of the INEEL must be labeled in accordance with applicable U.S. Department of Transportation labels and markings (49 CFR 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements"). In addition, waste labels must be visible, legibly printed or stenciled, and placed so that a full set of labels and markings are visible. See the INEEL waste acceptance criteria document (DOE-ID 2003) for additional labeling information.

6.2.4 Storage and Inspection

Wastes will be stored in a CWSU to be established by WGS within the TRA. Solid waste segregated as potentially hazardous or mixed and placed in 55-gal drums will be stored in the CWSU. To meet the substantive requirements of 40 CFR 264, Subpart I, "Use and Management of Containers," the Resource Conservation and Recovery Act (RCRA) inspection of the CWSU will be conducted as part of the weekly waste container inspection. The purposes of the weekly container inspection are to look for containers that are leaking or that are deteriorating due to corrosion or other factors, ensure that the containment system has not deteriorated due to corrosion, and verify that labels are in place and legible. Inspections of the containers and the CWSU are conducted to meet the requirements in ICP-MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL." When completed, the inspections will be documented on a weekly inspection form. The WGS will maintain the checklists used to guide the inspection.

6.2.5 Personal Protective Equipment

Personal protective equipment requiring disposal will include, but not be limited to, the following: gloves, respirator cartridges, shoe covers, and coveralls. Personal protective equipment will be disposed of in accordance with the requirements set forth in the INEEL waste acceptance criteria document (DOE-ID 2003) and as directed by WGS.

6.2.6 Hazardous Waste Determinations

All waste generated will be characterized in accordance with the requirements of 40 CFR 262.11, "Hazardous Waste Determination." Waste determinations will be completed by WGS. Completed hazardous waste determinations will be maintained for all waste streams as part of the project file held by WGS. The hazardous waste determinations may use two approaches to determine whether a waste is characteristic:

1. Process knowledge may be used if enough information exists to characterize the waste. Process knowledge may include direct knowledge of the source of the contamination and/or existing validated analytical data.

2. Analysis of representative samples of the waste stream may be performed by specialized RCRA protocols, standard protocols for sampling and laboratory analysis that are not specialized RCRA methods, or other equivalent regulatory-approved methods. In addition, process knowledge may influence the amount of sampling and analysis required in order to perform characterization.

Land disposal restrictions for hazardous waste are addressed in 40 CFR 268, "Land Disposal Restrictions." The INEEL-specific requirements for treatment, storage, and disposal are addressed in the INEEL waste acceptance criteria document (DOE-ID 2003). After the hazardous waste determinations are completed, the INEEL Integrated Waste Tracking System profile number is assigned, and the appropriate information is entered into the tracking system.

6.2.7 Waste Disposition

At the conclusion of the investigations, or when deemed necessary, industrial waste will be disposed of in the INEEL landfill, following the protocols and completing the forms identified by the INEEL waste acceptance criteria document (DOE-ID 2003). This industrial waste will be turned over to Central Facilities Area (CFA) Operations personnel for management under existing facility waste streams and in accordance with standing facility procedures. WGS will monitor the accumulation of the waste. When enough waste has accumulated to ship to one of the INEEL waste management units or off the INEEL to a commercial waste management facility, WGS will complete and submit the appropriate forms for approval, as required. The waste technical specialist will provide help in packaging and transporting the waste.

Disposition pathways have been identified for all waste streams that might be generated from this project. WGS will manage the determination and disposition of all waste streams generated during this project.

All low-level radioactive and mixed waste will be handled and disposed of in accordance with the requirements set forth in the INEEL waste acceptance criteria document (DOE-ID 2003). WGS is responsible for conducting and documenting inspections of waste containers before they are used. After sampling is completed, the individual waste streams destined for disposal at a facility on the INEEL will be approved and prepared in accordance with the INEEL waste acceptance criteria (DOE-ID 2003) and as directed by WGS.

Management of contaminated waste generated at a subcontract laboratory during analytical testing will be the responsibility of the subcontract laboratory. However, overall management of the samples must be performed in accordance with the requirements of MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." Specifically, MCP-3480 requires the facility environmental, safety, and health manager to provide written approval prior to return of any media and that written documentation of sample disposition be developed and maintained. To initiate return of the waste to the INEEL, the subcontract laboratory must notify Sample and Analysis Management in the form of a written report identifying the known volume and characteristics of each waste type, including shipping and packaging details. Final authorization for the return of waste will be provided in writing from Sample and Analysis Management with concurrence from the technical task manager to the subcontract laboratory. In the event that laboratory waste is returned, WGS will be contacted and will be responsible for the disposition of the waste.

6.2.8 Record-keeping and Reporting

Records and reports related to waste management are required to be maintained, as indicated by ICP-MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL." Some of these may be completed by others but must be available either at CFA or within the project files. All information related to the tracking and disposition of waste generated as a result of the sampling effort will be entered into the Integrated Waste Tracking System, which is operated and maintained by WGS. These records must include hazardous waste determinations, characterization information, and statements of process knowledge (by others).

6.3 Project-specific Waste Streams

Several distinct waste stream types anticipated to be generated during this project have been identified. Some of these waste types will be clean, but many could be contaminated. After generation, any or all of the waste may be reclassified; therefore, the intended waste management strategies for each are outlined in the following subsections. The following subsections describe the expected waste that will require compliant storage and/or disposal, including the intended management strategy from the time of generation until final disposition. Field and laboratory personnel will be responsible for segregating waste. The anticipated quantities also have been approximated; however, they are to be considered a rough order of magnitude, because in some cases, the type of contamination present cannot be determined before sampling and analysis. Estimated waste volumes are based on historical sampling activities conducted in support of other CERCLA actions conducted at the INEEL in addition to calculated volumes based on drawings and discussions with Idaho Completion Project (ICP) personnel.

6.3.1 Personal Protective Equipment

Personal protective equipment in the form of coveralls, leather and rubber gloves, and anti-contamination clothing could be generated because of sampling activities. The anticipated quantity of personal protective equipment to be generated and requiring disposal because of sampling activities is 1 yd^3, classified as clean.

6.3.2 Liquid Decontamination Residue

Decontamination methods for field and sampling equipment will ensure containment of all decontamination fluids, minimization of waste, and minimization of contaminated equipment. Decontamination fluids will be generated by wet decontamination of field equipment (for example, drilling equipment) and sampling equipment (for example, drill rods and bits). Decontamination fluids might contain oil and/or grease in addition to any radionuclide and/or hazardous contamination that might be present. The anticipated quantity of decontamination fluids to be generated and requiring disposal because of sampling activities is 15 gal, classified based on the site of origin. To verify the end classification of decontamination fluids, a sample of the rinsate water will be submitted for laboratory analysis.

6.3.3 Solid Decontamination Residue

As with the liquid decontamination residues, solid decontamination methods will ensure the minimization of waste and equipment contamination. Solid decontamination residues will be generated by the dry decontamination of field and sampling equipment. Dry decontamination methods will be used to the extent practicable to minimize the generation of liquid decontamination residues. The anticipated quantity of solid decontamination residues to be generated and requiring disposal as a result of the sampling activities is 15 gal, classified based on the site of origin. The end classification of the solid decontamination residues will be based on the results of the analytical samples collected from the contaminated source.

6.3.4 Plastic Sheeting

Plastic sheeting may be used as an environmental barrier to contamination and to provide a laydown site for staging equipment and tooling. Based on historical use of plastic sheeting at environmental remediation sites, the anticipated volume to be generated and requiring disposal because of sampling activities is 1 yd^3, classified as clean.

6.3.5 Unused/Unaltered Sample Material

Unused/unaltered sample material will be generated from the sampling activities in the form of soil and water not required for sampling and analysis. In most cases, the analytical laboratory will be responsible for disposal of the unused/unaltered sample material and any waste generated as a result of analyzing the samples. If the unused sample material must be returned from the laboratory, only the unused, unaltered samples in the original sample containers will be accepted. The unused, unaltered sample material will be returned to the point of origin whenever possible. In instances when sample material cannot be returned to the point of origin, the material will be consolidated for disposal at an approved facility.

6.3.6 Analytical Residues

Analytical residues will be generated from the sample analytical activities conducted by subcontracted laboratories. Although the laboratories are required to dispose of analytical residues under terms of the subcontract, the potential does exist for return of the residues, particularly in the case of materials regulated under the Toxic Substances Control Act. The anticipated quantity of analytical residues to be generated and requiring disposal because of sampling activities is 3 gal, which will be classified based on the site of origin. Any residues returned to the INEEL for disposal will be consolidated for eventual disposal at an approved facility.

6.3.7 Sample Containers

Sample containers will become a waste stream after analysis. As with unused/unaltered sample material, the analytical laboratory will be responsible for disposal of the sample containers. If the unused sample material must be returned from the laboratory, the samples will be consolidated for disposal, and the sample containers—by virtue of the empty container rule—will be disposed of as clean waste.

6.3.8 Hydraulic Spills

A small quantity of waste hydraulic oil (less than 5 gal) might be generated during the drilling operation. The waste oil will be collected in drip pans. The collected hydraulic oil will be removed to the CFA Land Farm. Final determination will partially depend on quantities generated and will be performed by WGS.

6.3.9 Miscellaneous Waste

Miscellaneous waste (such as trash, labels, rags, and other miscellaneous debris) might be generated during the project. The anticipated quantity of miscellaneous waste to be generated and requiring disposal because of sampling activities is less than 2 yd^3, classified as clean. Clean miscellaneous waste will be removed to the CFA Landfill.

6.3.10 Purge Water

Purge water will be generated during the development and sampling of the wells. The volume of purge water from TRA-1933 and -1934 is estimated to be less than 150 gal. Purge water will be contained in holding tanks with secondary containment. The waste will be disposed of in accordance with the WGS determination. A waste profile for the TRA perched water is being completed; completion is expected by the time drilling begins.

6.3.11 Drill Cuttings

Drill cuttings will be generated during the drilling of the TRA-1933 and -1934 wells. The volume of these cuttings is estimated to be approximately 65 ft^3. Drill cuttings will be considered waste unless a clean determination is made by WGS. Diesel contamination will likely be encountered during drilling. All cuttings will be contained in a tank or box with secondary containment. A small volume of water will likely be generated during drilling. If sufficient water is standing in the cuttings, the water will be pumped out of the cuttings container and disposed of as directed by WGS. Water generated during drilling may be consolidated with the purge water before disposal. Drill cuttings will be disposed of at the facility designated by WGS. Any free water that cannot be pumped out of the waste boxes will be dried using a water-absorbent material, such as Water Work Crystals SP-400, to prevent free water accumulation.

7. DOCUMENTATION MANAGEMENT AND SAMPLE CONTROL

Subsection 7.1 summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures. Subsection 7.2 outlines sample handling and discusses chain of custody and radioactivity screening for shipment to the analytical laboratory (if required). The analytical results from this sampling effort will be documented in a final report to be submitted to the Idaho Department of Environmental Quality.

7.1 Documentation

The FTL will be responsible for controlling and maintaining all field documents and records and for ensuring that all required documents are submitted to ICP Administrative Record and Document Control. All entries will be made in permanent ink. A single line will be drawn through any error with the correct information entered next to it. All corrections will be initialed and dated.

7.1.1 Sample Container Labels

Waterproof, gummed labels generated from the SAP database will display information such as the sample ID number, the name of the project, the sample location, and the analysis type. In the field, labels will be completed and placed on the containers before collecting the sample. The labels will be completed with the sample date, sample time, preservative used, field measurements of hazards, and the sampler's initials during field sampling.

7.1.2 Field Guidance Forms

Field guidance forms, provided for each sample location, will be generated from the SAP database to ensure unique sample numbers. These forms are used to facilitate sample container documentation and organization of field activities, and the forms contain information regarding the following:

- Media
- Sample ID numbers
- Sample location
- Aliquot ID
- Analysis type
- Container size and type
- Sample preservation.

7.1.3 Field Logbooks

In accordance with Administrative Record and Document Control format, field logbooks will be used to record information necessary to interpret the analytical data. All field logbooks will be controlled and managed according to MCP-1194, "Logbook Practices for ER and D&D&D Projects."

7.1.3.1 *Sample Logbooks.*

Field teams will use sample logbooks. Each sample logbook will contain information such as the following:

- Physical measurements (if applicable)
- All QC samples
- Sample date, time, and location
- Shipping information (for example, shipping dates, cooler ID number, destination, chain-of-custody number, and name of shipper).

7.1.3.2 *Field Team Leader's Daily Logbook.*

An operational logbook maintained by the FTL will contain a daily summary of the following:

- All the project field activities
- Problems encountered
- Visitor log
- List of site contacts.

This logbook will be signed and dated at the end of each day's sampling activities.

7.1.3.3 *Field Instrument Calibration/Standardization Logbook.*

A logbook containing records of calibration data will be maintained for each piece of equipment requiring periodic calibration or standardization. This logbook will contain sheets to record the date, time, method of calibration, and instrument ID number.

7.1.3.4 *Drilling Logbook.*

The on-site geologist will maintain a logbook containing the record of drilling activities, lithology, and borehole conditions. The logbook will contain sheets to record the depth, time, condition and lithology of the borehole.

7.2 Sample Handling

Analytical samples for laboratory analyses will be collected in precleaned containers and packaged according to procedures recommended by the American Society for Testing and Materials or the EPA. The duplicate QA samples will be included to satisfy the QA requirements for the field operation, as outlined in the QAPjP (DOE-ID 2002). Only analytical and testing laboratories approved by Sample and Analysis Management will analyze these samples.

7.2.1 Sample Preservation

For samples requiring controlled temperatures of 4°C (39°F) for preservation, the temperature will be checked periodically before sample shipment to certify adequate preservation. Ice chests (coolers) containing frozen, reusable ice will be used to chill the samples in the field after sample collection, if required.

7.2.2 Chain-of-Custody Procedures

The chain-of-custody procedures outlined in MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment," and the QAPjP (DOE-ID 2002) will be followed. Sample bottles will be stored in a secured area accessible only to the field team members.

7.2.3 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by the U.S. Department of Transportation (49 CFR 171 through 173 and 175 through 178) and EPA sample-handling, -packaging, and -shipping methods (40 CFR 262 Subpart C and 40 CFR 263). All samples will be packaged in accordance with the requirements set forth in MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment."

7.2.3.1 Custody Seals. Custody seals will be placed on all shipping containers in a manner that prevents tampering or unauthorized opening from compromising sample integrity. Clear plastic tape will be placed over the seals to ensure that the seals are not damaged during shipment.

7.2.3.2 On-Site and Off-Site Shipping. An on-Site shipment is any transfer of material within the perimeter of the INEEL. Site-specific requirements for transporting samples within INEEL boundaries and those required by the shipping/receiving department will be followed. Shipment within the INEEL boundaries will conform to U.S. Department of Transportation requirements, as stated in 49 CFR, "Transportation." All shipments will be coordinated with WGS, as necessary, and conform to the applicable packaging and transportation MCPs. Radiological Control personnel must screen all samples to be removed from the task site for radiological contaminants before the samples are shipped.

7.3 Document Revision Requests

Revisions to this document will follow the requirements set forth in MCP-135, "Creating, Modifying, and Canceling Procedures and Other DMCS-Controlled Documents."

8. REFERENCES

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Appendix A

Sampling and Analysis Plan Table

Plan Table Number: TRA,PER,PW-13

SAP Number: ICP/EXT-04-00131

Sampler: Whitmore, E. J.

Date: 03/16/2004 Plan Table Revision: 0.0 Project: CHARACTERIZA. DIESEL CONTAM. TRA PERCHED H2O, WELL PW-13 Project Manager: WOOD, T. R.

SMO Contact: CHAMBERS, L. S.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										A1	AN	BX	BH	5C	N2	RH	G6	D6	TL	TG	LL	R8							
TRA111	REG	GROUND WATER	GRAB	GRAB	3/22/04	TRA	WELL	TRA-1933	TBD	1	1		1	1	1	1	1	1			1	1							
TRA112	REG/QC	GROUND WATER	DUP	GRAB	3/22/04	TRA	WELL	TRA-1934	TBD	2	2	2		2	2	2			2	2	2	2							
TRA113	QC	GROUND WATER	FBLK	GRAB	3/22/04	TRA	FIELD BLANK	QC	TBD	1	1	1		1	1	1			1	1	1	1							
TRA114	QC	GROUND WATER	TBLK	GRAB	3/22/04	TRA	TRIP BLANK	QC	TBD											1									
TRA115	QC	GROUND WATER	TBLK	GRAB	3/22/04	TRA	TRIP BLANK	QC	TBD											1									

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Alkalinity
AT2: Anions
AT3: BTEX
AT4: BTEX - MS/MSD
AT5: Chromium
AT6: Nitrate/Nitrite
AT7: Radiochemistry - Suite 1
AT8: TPH - Gasoline - MS/MSD
AT9: TPH Diesel - MS/MSD
AT10: TPH/Diesel

AT11: TPH/Gasoline
AT12: Total Metals (TAL) - Filtered
AT13: Tritium
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:

Total Metals (TAL) Filtered: TO BE filtered in the field.

Total Metals (TAL) Filtered defined as: Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Si, Ag, Na, Sr, Tl, U, V, Zn.

Analysis Suites:

Radiochemistry - Suite 1: Gamma Spec, Sr-90

Contingencies: